

What Is Claimed Is:

1. A device for setting cache space in a data processing system including a computer on which a database management system runs, a storage device which includes a cache and stores data in  
5 databases which the database management system manages, and administrative device which manages the computer and the storage device, wherein the computer, the storage device, and the administrative device are interconnected via a network, the device comprising:

10 means for acquiring information about process details to be executed by the data management system;

means for acquiring information about data mapping from the computer and the storage device;

means for creating planned cache space settings, using the  
15 acquired information; and

means for directing the storage device to activate cache space settings according to the planned cache space settings.

2. The device according to claim 1, wherein all the means are corresponding functions realized by a system management  
20 program provided on the administrative device.

3. The device according to claim 1, further comprising:  
storage control means which are connected to the computer and the storage device and controls data transfer between both;  
mapping means for defining mapping to data on the databases  
25 in the storage control means; and

means for acquiring information about mapping of data on

the databases from the mapping means.

4. The device according to claim 1, wherein all the means are functions realized in the computer, the storage device or, the storage control means.

5        5. The device according to claim 1, wherein the administrative device includes means for acquiring, as information about the process details to be executed by the data management system, SQL statements to be executed for the process and an expected count of execution of the SQL statements.

10       6. The device according to claim 5, wherein the administrative device includes means for acquiring, as information about the process details to be executed by the data management system, a ratio of execution of the process as well.

      7. The device according to claim 2, wherein:  
15       the administrative device includes:  
      means for further acquiring, as the acquired information, information about performance of rerun of processes after abnormal termination of the database management system and information about rerun time settings after abnormal termination of the  
20       database management system; and

      means for creating planned cache space settings for logs which the data base management system outputs as the planned cache space settings on the storage device.

      8. The device according to claim 2, wherein:  
25       the administrative device includes:  
      means for further acquiring, as information about the

process details to be executed by the data management system,  
information about size of data to be accessed during the process  
execution, information about distribution of access to data to  
be accessed during the process execution, and information about  
5 cache space available in the database management system and the  
storage device; and

means for creating planned cache space settings for tables  
and indexes which are data which the database management system  
manages as the planned cache space settings on the storage device.

10 9. The device according to claim 5, wherein:

the storage device includes means for acquiring operating  
statistics information about access to the cache and the database  
management system includes means for acquiring operating  
statistics information about wait occurrences when accessing  
15 tables and indexes which the database management system manages;  
and

the administrative device includes means for further  
acquiring, as the acquired information, the cache access related  
operating statistics information as well as the operating  
20 statistics information about wait occurrences when accessing the  
tables and indexes, and means for creating planned change to cache  
space settings for tables and indexes which the database management  
system manages as the planned cache space settings on the storage  
device.

25 10. The device according to claim 1, wherein the  
administrative device includes means for acquiring, as

information about the process details to be executed by the data management system, the number of expected data pages to access in tables and indexes which are data which the database management system manages during the process.

5           11. The device according to claim 10, wherein:

the administrative device includes:

means for further acquiring, as information about the process details to be executed by the data management system, a ratio of execution of the process, information about size of data  
10 to be accessed during the process execution, information about distribution of access to data to be accessed during the process execution, and information about cache space available in the database management system and the storage device; and

means for creating planned cache space settings for tables  
15 and indexes which are data which the database management system manages as the planned cache space settings on the storage device.

12. The device according to claim 10, wherein:

the storage device includes means for acquiring operating statistics information about access to the cache and the database  
20 management system includes means for acquiring operating statistics information about wait occurrences when accessing tables and indexes which the database management system manages; and

the administrative device further includes means for  
25 acquiring, as the acquired information, the cache access related operating statistics information as well as the operating

statistics information about wait occurrences when accessing the tables and indexes, and means for creating planned change to cache space settings for tables and indexes which the database management system manages.

5           13. A computer-executable program for setting cache space which is executed in a data processing system comprising a computer on which a database management system runs and a storage device which includes databases on which data is stored under management of the database management system and a data cache which  
10 temporarily retains data from the databases, the computer-executable program comprising:

          means for acquiring information about process details to be executed by the data management system;

          means for acquiring information about data mapping from the  
15 computer and the storage device;

          means for creating planned cache space settings, using acquired information; and

          means for directing the storage device to activate cache space settings according to the planned cache space settings.

20           14. A method for managing a data cache in a data processing system including a storage device which includes disk storage units on which data is stored and a data cache which temporarily retains at least a part of the data that is stored on the disk storage units, a computer on which a database management system (DBMS)  
25 program which manages storing data to the storage device is run, the computer carrying out data processing, and an administrative

device provided with a system management program for supervising and managing the computer and the storage device, wherein the storage device, the computer, and the administrative device are interconnected via a network,

5       the method comprising the steps of:

          determining a maximum number of processes that can be executed during a rerun, referring to process design information;

          obtaining SQL statements to do INSERT/UPDATE from the processes and expected repetition rates of the SQL statements;

10       determining maximum data size of logs to be output by the SQL statements to do UPDATE/INSERT;

          calculating log data size per process from the maximum data size of logs;

          estimating log size required, based on the log data size  
15       per process and the maximum number of processes that can be executed during a rerun;

          setting cache space as much as or more than the log size required during a rerun to reside on the data cache; and

          allocating cache storage areas according to cache space  
20       settings thus determined.

15. The method for managing a data cache according to claim 14, wherein, if a logical disk storage unit to which logs should be stored belongs to a free cache group, the free cache group is defined and a part or all of the cache space as much as or more  
25       than the log size required during a rerun is allocated to the cache group.

16. A method for managing a data cache in a data processing system including a storage device which includes disk storage units on which data is stored and a data cache which temporarily retains at least a part of the data that is stored on the disk storage units, a computer which includes a cache and on which a database management system (DBMS) program which manages storing data to the storage device is run, and an administrative device provided with a system management program for supervising and managing the computer and the storage device,

10 the method comprising the steps of:

allocating equal amounts of space in the cache of the DBMS and the data cache of the storage device to all data structures;

specifying a cache effect function for each data structure and allocating space in the cache of the DBMS to each data structure,

15 using the cache effect function;

specifying the cache effect function and allocating space in the data cache to each data structure, using the cache effect function; and

directing the DBMS and/or the storage device to activate  
20 cache space allocations thus determined.

17. The method of claim 16, further comprising:

determining the data quantity of data pages to store data except leaf nodes for each data structure and allocating space available in the cache of the DBMS as much as the data quantity  
25 thus determined to each data structure; and

determining the data quantity of data pages to store leaf

nodes and allocating space available in the data cache of the storage device as much as the data quantity thus determined and space available in the cache of the DBMS by a predetermined ratio to the corresponding data cache space to each data structure.

5           18. The method of claim 16, further comprising the steps of:

          in the data processing system,

          virtualizing the disk storage units into a plurality of logical disk storage units;

10           dividing the whole data cache space into groups having storage areas in units of the logical disk storage units;

          identifying a logical disk storage unit to which logs should be stored and a cache group under which the logical disk storage unit falls from mapping information; and

15           directing the storage device to activate the cache group thus identified and cache space settings of storage areas for the cache group.

          19. The method of claim 16, wherein table and index data is used as data structures.

20           20. The method of claim 16, wherein the DBMS manages its own cache and the data cache of the storage device, regarding the caches as a single cache entity.

          21. The method of claim 16, further comprising the steps of:

25           issuing a caching request from the DBMS to the storage device to cache data from a storage location within the storage device



to the data cache; and

issuing a write request with the caching request to cache data which has just been written to the cache within the DBMS to the data cache within the storage device.

5           22. A method for optimum caching management for data cache in a data processing system including a storage device which includes disk storage units on which data is stored and a data cache which temporarily retains at least a part of the data that is stored on the disk storage units, a computer on which a database  
10 management system (DBMS) program which manages storing data to the storage device is run, and an administrative device provided with a system management program for supervising and managing the computer and the storage device,

the method for optimum caching management for the data cache  
15 comprising the steps of:

checking statistics about a count of occurrences of wait when accessing data pages of data structures within the DBMS;

identifying processes involving access to a data structure for which it has been determined that wait has occurred with high  
20 frequency and obtaining the number of expected data pages to access in the data structure;

checking for a process which takes long execution time and accessed many times the data structure for which wait has occurred with high frequency among the processes involving access to the  
25 data structure;

tailoring cache allocations to enhance a cache hit rate of

the data to be accessed during the process execution to shorten the execution time of the process; and

directing the storage device to activate change to data cache allocations according to tailored cache allocations.

5           23. The method for optimum management for data cache according to claim 22, further comprising the step of tailoring cache allocations to enhance the cache hit rate of the data to be accessed during the execution of the processes and reduce the total sum of execution time of the processes as a whole.

10           24. The device according to claim 1, wherein the means for acquiring information acquire data mapping information from the database management system, a file system, and a volume manager included on the computer.